इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 9353 (1980): Alachlor, Technical [FAD 1: Pesticides and Pesticides Residue Analysis]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 9353 - 1980

(Reaffirmed - 2012)

Indian Standard

SPECIFICATION FOR ALACHLOR, TECHNICAL

UDC 632·951 ALACHLOR

© *Copyright* 1980

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 6·00

October 1980

Indian Standard

SPECIFICATION FOR ALACHLOR, TECHNICAL

Pest Control Sectional Committee, AFCDC 6

Chairman	*Representing*
DR K. D. PAHARIA	Directorate of Plant Protection, Quarantine & Storage (Ministry of Agriculture & Irrigation), Faridabad
Members	
DR N. S. AGARWAL	Ministry of Agriculture & Irrigation (Department of Food)
DR K. KRISHNAMURTHY (*Alternate*)	
DR H. L. BAMI	Central Forensic Science Laboratory (Central Bureau of Investigation), New Delhi
DR B. BANERJEE	Tea Research Association, Calcutta
DR G. SATYANARAYANA (*Alternate*)	
DR S. R. BAROOAH	Pesticides Formulators Association of India (S. S. I.), Bombay
DR N. K. BASU	The Alkali & Chemical Corporation of India Limited, Calcutta
SHRI S. R. NENE (*Alternate*)	
DR A. K. BHATNAGAR	Hindustan Insecticides Limited, New Delhi
SHRI C. C. ABRAHAM (*Alternate*)	
DR S. S. CHADHA	Pesticides Association of India, New Delhi
SHRI S. K. RAMAN (*Alternate*)	
CHIEF PLANT PROTECTION OFFICER	Department of Agriculture, Government of Maharashtra, Bombay
CHEMIST INCHARGE, INSECTICIDES TESTING LABORATORY (*Alternate*)	
SHRI V. G. DESHPANDE	Ciba-Geigy of India Limited, Bombay
SHRI E. A. ALMEIDA (*Alternate*)	
SHRI O. P. DHAMIJA	Export Inspection Council of India, New Delhi
SHRI P. P. RANGA RAO (*Alternate*)	
DR M. S. DHATT	National Malaria Eradication Programme, Delhi
DIRECTOR OF AGRICULTURE	Department of Agriculture, Government of Uttar Pradesh, Lucknow
DEPUTY DIRECTOR (PLANT PROTECTION) (*Alternate*)	
DRUGS CONTROLLER (INDIA)	Indian Pharmacopoeia Committee (Ministry of Health & Family Welfare), New Delhi
SHRI M. RAVIKANT (*Alternate*)	

(*Continued on page* 2)

© *Copyright* 1980

INDIAN STANDARDS INSTITUTION

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(Continued from page 1)

Members	*Representing*
Shri G. D. Gokhale	Bombay Chemicals Private Limited, Bombay
Shri V. V. Ketkar (*Alternate*)	
Joint Director of Agriculture (Development & ICP)	Department of Agriculture, Government of Karnataka, Mysore
Deputy Director of Agriculture (Plant Protection) (*Alternate*)	
Dr R. L. Kalra	Punjab Agricultural University, Ludhiana
Dr R. P Chawla (*Alternate*)	
Dr Krishan Singh	Indian Institute of Sugarcane Research (ICAR), Lucknow
Dr S. C. Srivastava (*Alternate*)	
Shri S. G. Krishnan	National Organic Chemical Industries Limited, Bombay
Dr J. S. Verma (*Alternate*)	
Shri S. K. Luthra	Directorate General of Technical Development, New Delhi
Shri S. C. Bajaj (*Alternate*)	
Shri S. K. Majumdar	Central Food Technological Research Institute (CSIR), Mysore
Shri M. Muthu (*Alternate*)	
Shri K. S. Mehta	Bharat Pulverising Mills Private Limited, Bombay
Shri S. Chatterji (*Alternate*)	
Dr A. L. Mookerjee	Cyanamid India Limited, Bombay
Shri J. P. Parikh (*Alternate*)	
Dr S. K. Mukerjee	Agricultural Chemicals Division, Indian Agricultural Research Institute (ICAR), New Delhi
Dr N. K. Roy (*Alternate*)	
Shri K. R. Narayana Rao	Food Corporation of India, New Delhi
Smt K. K. M. Bhavnani (*Alternate*)	
Shri I. Narsareddy	Department of Agriculture, Government of Andhra Pradesh, Hyderabad
Shri C. Dharma Rao (*Alternate*)	
Dr V. N. Nigam	Ministry of Defence (DGI)
Shri P. N. Agrawal (*Alternate*)	
Dr S. Y. Pandit	Bayer (India) Limited, Bombay
Shri D. N. Nakhate (*Alternate*)	
Dr T. N. Parthasarathy	Regional Research Laboratory (C S I R), Hyderabad
Dr J. Madhusudhan Rao (*Alternate*)	
Shri M. A. Patel	Department of Agriculture, Government of Gujarat, Ahmadabad
Shri C. F. Paul	Ministry of Defence (R & D)
Shri M. G. Chatterjee (*Alternate*)	
Shri Y. A. Pradhan	Rallis India Limited, Bombay
Dr Z. J. Kapadia (*Alternate*)	
Dr Rattan Lal	Entomology Division, Indian Agricultural Research Institute (ICAR), New Delhi

(Continued on page 10)

AMENDMENT NO. 1 APRIL 1985
TO
IS:9353-1980 SPECIFICATION FOR ALACHLOR, TECHNICAL

(*Page 4, Table 1*) - Substitute 'IS:6940-1982*' *for* 'IS:6940-1973*'.

(*Page 4, Table 1, foot-note with* '*' *mark*) - Substitute the following for the existing foot-note:

'*Methods of test for pesticides and their formulations (*first revision*)'.

(*Page 5, clause 4.1 and Note*) - Substitute the following for the existing matter:

'4.1 Representative samples of the material shall be drawn as prescribed in IS:10946-1984, Methods of sampling for technical grade pesticides'.

(*Pages 7 and 8, clause A-1.5*) - Substitute the following for the existing clause:

'A-1.5 Calculation

$$\text{Alachlor content, percent by mass} = \frac{M_1 \times P_1 \times A_2 \times 100}{M_3 \times A_1 \times RF}$$

where

M_1 = mass of internal standard taken for the test

P_1 = percentage purity of the internal standard,

A_2 = peak height or area corresponding to alachlor,

M_3 = mass of sample taken for the test,

A_1 = peak height or area corresponding to the internal standard, and

$$RF = \frac{M_1 \times P_1 \times A_2}{M_2 \times P_2 \times A_1}$$

where

P_2 = percentage purity of alachlor, and

M_2 = mass of the reference standard taken.

(AFCDC 6)

Indian Standard

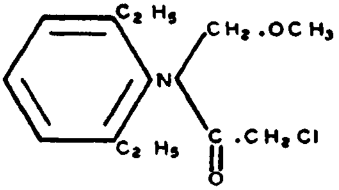
SPECIFICATION FOR ALACHLOR, TECHNICAL

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 11 June 1980, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

0.2 Alachlor is a herbicide used in the formulations meant for agriculture.

0.3 Alachlor is the proposed common name by the International Organization for Standardization (ISO) for the pesticidal chemical 2-chloro-2', 6' — diethyl–N–methoxy methyl acetanilide. The empirical and structural formulae and the molecular mass of alachlor are indicated below :

Empirical formula	*Structural formula*	*Molecular mass*
$C_{14}H_{20}ClNO_2$		269·76

0.4 In the preparation of this standard, due consideration has been given to the provisions of the Insecticides Act, 1968, and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

---

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for alachlor, technical.

2. REQUIREMENTS

2.1 Description — Alachlor, technical, shall be in the from of solid or semi-solid mass below 40°C, yellow to wine red in colour and free from extraneous impurities.

2.2 The material shall also comply with the requirements specified in Table 1.

TABLE 1 REQUIREMENTS FOR ALACHLOR, TECHNICAL

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Appendix	Cl No. of IS : 6940-1973*
(1)	(2)	(3)	(4)	(5)
i)	Alachlor content, percent by mass, *Min*	90	A	—
ii)	Moisture content, percent by mass, *Max*	0·3	—	4
iii)	Material insoluble in acetone, percent by mass, *Max*	0·15	—	9
iv)	Acidity (as H_2SO_4), percent by mass, *Max*	0·2	—	11.3.2

*Methods of tests for pesticides and their formulations.

3. PACKING AND MARKING

3.1 Packing — The material shall be packed according to requirements given in IS : 8190 (Part I) - 1980*.

3.2 Marking — The container shall bear legibly and indelibly the

---

*Requirements for packing of pesticides : Part I Solid pesticides (*first revision*).

following information and any other information as is necessary under the Insecticides Act and Rules:

a) Name of the material;
b) Name of the manufacturer;
c) Date of manufacture;
d) Batch number;
e) Alachlor content, percent (*m/m*);
f) Net mass of the contents; and
g) The cautionary notice as worded in Insecticides Act and Rules.

3.2.1 Each container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in 'Indian Standard methods for sampling of pesticides and their formulations'(*under preparation*).

NOTE — Till such time the standard under preparation is published, the sample shall be drawn as agreed to between the concerned parties.

5. TESTS

5.1 Tests shall be carried out by appropriate methods referred to in col 4 and 5 of Table 1.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be employed in the tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of the analysis.

---

*Specification for water for general laboratory use (*second revision*).

APPENDIX A

[*Table* 1, *Item* (i)]

DETERMINATION OF ALACHLOR CONTENT

A-0. GENERAL

A-0.1 Either of the two methods, namely, gas chromatographic method and potentiometric titration method may be used for determination of alachlor content.

A-1. GAS CHROMATOGRAPHIC METHOD

A-1.1 Principle — The alachlor content is determined using an internal standard on a gas chromatograph equipped with either a thermal conductivity or flame ionization detector.

A-1.2 Apparatus

A-1.2.1 *Gas Liquid Chromatograph* — equipped with either a thermal conductivity or a flame ionization detector and a suitable recorder with an electronic integrator.

Detector		*Thermal Conductivity Detector (TCD),*	*Flame Ionization Detector (FID),*
Column		*Stainless steel* 1·8 m × 3 mm packed with 10 percent SE-30 on 80-100 mesh Diatoport-S.	*Glass* 1·2 × 2 mm packed with 5 percent SE-30 on 80-100 mesh Chromosorb WHP.
Temperature			
	Column —	225°C	190°C
	Injection —	235°C	240°C
	Detector —	235°C	240°C
Carrier gas		Helium	Nitrogen

NOTE — Operating parameter as well as attenuation and chart speed shall be adjusted to obtain optimum response and reproducibility.

A-1.2.2 *Microsyringe* — 5 or 10 µl capacity.

A-1.3 Reagents

A-1.3.1 *Standard Reference Alachlor* — of known 99 percent plus purity.

A-1.3.2 *Chloroform or Acetone*

A-1.3.3 *Internal Standard Solution* — Weigh 0·625 g of benzyl benzoate or 0·15 g triphenyl methane in 50 ml volumetric flask and make up to volume with chloroform and acetone respectively.

A-1.4 Procedure

A-1.4.1 *Preparation of the Sample Solution* — Weigh accurately, sample equivalent to 0·08 g or 0·2 g into a small glass stoppered flask or screw-cap bottle for TCD or FID respectively. Add by pipette, 10 ml of the internal standard solution. Close tightly and shake thoroughly to dissolve and extract the alachlor. For coarse or granular materials, shake mechanically for 30 minutes or shake by hand intermittently for one hour (final concentration : 20 mg alachlor and 12·5 mg benzyl benzoate/ml or 8 mg alachlor and 3 mg triphenyl methane/ml).

A-1.4.2 *Preparation of Reference Standard* — Weigh accurately sample equivalent to 0·08 g or 0·2 g into a small glass stoppered flask or scerw-cap bottle for TCD or FID respectively. Add by pipette, 10 ml of the internal standard solution and shake to dissolve. (Final concentration: 20 mg alachlor and 12·5 mg benzyl benzoate/ml or 8 mg alachlor and 3 mg triphenylmethane/ml).

A-1.4.3 *Analysis of the Sample* — Inject 2 µl of the standard and, if necessary, adjust the instrument parameters and the volume injected to give a complete separation within a reasonable time and peak heights from ½ to ¾ full scale. The elution order for TCD is benzyl benzoate followed by alachlor and for FID it is alachlor then tri-phenylmethane. Proceed with the determination at least re-injecting each of standard and sample solution in random order.

A-1.4.4 Measure the peak heights or areas of alachlor and benzyl benzoate from both standard — internal standard solution and the sample — internal standard solution. Determine the RF values for each injection standard — internal standard solution.

A-1.5 Calculation

$$\text{Alachlor content, percent by mass} = \frac{M_1 \times P_1 \times A_2 \times 100}{M_3 \times A_1 \times RF}$$

where

M_1 = mass of internal standard taken for the test,

P_1 = percentage purity of the internal standard,

A_2 = peak height or area corresponding to alachlor,

M_3 = mass of sample taken for the test,

A_1 = peak height or area corresponding to the internal standard, and

$$RF = \frac{M_1 \times P_1 \times A_2}{M_2 \times P_2 \times A_1}$$

where P_2 = percentage purity of alachlor.

A-2. POTENTIOMETRIC TITRATION METHOD

A-2.1 Principle — Refluxing with aniline quantitatively removes the chlorine from alachlor. The ionic chlorine is then titrated against silver nitrate potentiometrically. This gives total chlorine from which alachlor concentration can be computed.

A-2.2 Apparatus

A-2.2.1 p*H Meter* — capable of performing potentiometric titrations.

A-2.2.1.1 *Electrode system* — 0·5 M K_2SO_4: $Hg_2SO_4.Hg$

A-2.3 Reagents

A-2.3.1 *Acetone*

A-2.3.2 *Sulphuric Acid* — 50 percent (*m/m*)

A-2.3.3 *Silver Nitrate* — 0 1 N.

A-2.3.4 *Aniline*

A-2.4 Procedure

A-2.4.1 Weigh accurately about 0·5 g of the sample in a 10 ml pear shaped flask fitted with ground glass joint. Add 3 ml of aniline and a carborundum, boil and reflux vigorously for 30 minutes using a ground glass joint water condenser. Cool, add 10 ml acetone through the condenser, extract the contents of the flask in a 250-ml beaker with small portions of acetone and one rinse of 5 to 7 ml of distilled water. Dilute to 100 ml with acetone. Acidify with 7 ml of 50 percent (*m/m*) sulphuric acid. Aniline sulphate will precipitate immediately. Keep the beaker on a magnetic stirrer, add the stirrer bar to the beaker and stir magnetically. Precipitate of aniline sulphate will dissolve. Cool to 15°C and titrate potentiometrically with 0·1 N silver nitrate.

A-2.4.2 The starting potential will be negative 430-450 mV and the end point signified by the largest potential dropper increment of 0·1 N of silver nitrate will be in the neighbourhood of 150 mV.

A-2.5 Calculation

$$\text{Alachlor content, percent by mass} = \frac{V_1 \times 2\cdot69765 \times f}{M}$$

where

V_1 = ml of standard silver nitrate used

$$f = \frac{\text{Percent alachlor (GLC basis) in technical material}}{\text{Percent alachlor (chlorine basis) in technical material}}$$

M = mass in g of the sample taken for the test.

(*Continued from page* 2)

Members	*Representing*
SECRETARY	Central Insecticides Board, Directorate of Plant Protection, Quarantine & Storage (Ministry of Agriculture & Irrigation), Faridabad
AVM J. K. SEHGAL	Directorate General Armed Forces Medical Services, Ministry of Defence
COL K. K. GHULIANI (*Alternate*)	
DR K. S. SINGH	Indian Veterinary Research Institute (ICAR), Izatnagar
SHRI S. C. SRIVASTAVA (*Alternate*)	
SHRI N. S. VENKATARAMAN	Department of Agriculture, Government of Tamil Nadu, Madras
DR P. R. VENKATESWARAN	Union Carbide (India) Limited, New Delhi
DR K. N. SHRIVASTAVA (*Alternate*)	
SHRI N. G. WAGLE	Pest Control (India) Private Limited, Bombay
SHRI M. R. BAJIKAR (*Alternate*)	
DR B. L. WATTAL	National Institute of Communicable Diseases, Delhi
SHRI V. N. BHATNAGAR (*Alternate*)	
SHRI T. PURNANANDAM, Director (Agri & Food)	Director General, ISI (*Ex-officio Member*)

Secretary

SHRI LAJINDER SINGH
Assistant Director (Agri & Food), ISI

Pesticides Subcommittee, AFCDC 6 : 1

Convener	
DR K. D. PAHARIA	Directorate of Plant Protection, Quarantine & Storage (Ministry of Agriculture & Irrigation), Faridabad
Members	
DR N. S. AGARWAL	Ministry of Agriculture & Irrigation (Department of Food)
DR K. KRISHNAMURTHY (*Alternate*)	
SHRI E. A. ALMEIDA	Ciba-Geigy of India Limited, Bombay
SHRI F. QUADROS (*Alternate*)	
DR H. L. BAMI	Central Forensic Science Laboratory (Central Bureau of Investigation), New Delhi
DR N. K. BASU	The Alkali & Chemical Corporation of India Limited, Calcutta
SHRI S. R. NENE (*Alternate*)	
DR A. K. BHATNAGAR	Hindustan Insecticides Limited, New Delhi
SHRI C. C. ABRAHAM (*Alternate*)	

(*Continued on page* 11)

(*Continued from page* 10)

Members	*Representing*
Shri S. S. Bhatnagar	Hindustan Petroleum Corporation Limited, Bombay
Shri S. P. Sharma (*Alternate*)	
Dr B. P. Chandrasekhar	BASF India Limited, New Delhi
Dr J. C. Majumdar (*Alternate*)	
Shri C. Dharma Rao	Pesticides Testing Laboratory, Hyderabad
Dr M. S. Dhatt	National Malaria Eradication Programme, Delhi
Shri V. Dorairaj	Plastic Containers Sectional Committee, MCPD 11, (ISI)
Shri G. D. Gokhale	Bombay Chemicals Private Limited, Bombay
Shri V. V. Ketkar (*Alternate*)	
Shri D. R. Gupta	Central Revenues Control Laboratory (Ministry of Finance), New Delhi
Shri S. Krishnamurthy (*Alternate*)	
Dr Kalyan Singh	Chander Sekhar Azad University of Agriculture & Technology, Kanpur
Shri K. S. Mehta	Bharat Pulverising Mills Private Limited, Bombay
Shri S. Chatterji (*Alternate*)	
Shri L. S. Mirle	Agromore Limited, Bangalore
Dr S. K. Mukerjee	Agricultural Chemicals Division, Indian Agricultural Research Institute (ICAR), New Delhi
Dr N. K. Roy (*Alternate*)	
Dr S. Y. Pandit	Bayer (India) Limited, Bombay
Shri D. N. Nakhate (*Alternate*)	
Dr T. N. Parthasarathy	Regional Research Laboratory (CSIR), Hyderabad
Dr P. S. Phadke	Sandoz (India) Limited, Thane
Shri A. V. Natu (*Alternate*)	
Plant Protection Adviser to the Government of India	Directorate of Plant Protection, Quarantine & Storage (Ministry of Agriculture & Irrigation), Faridabad
Dr V. Lakshminarayana (*Alternate*)	
Shri S. M. Pradhan	Metal Containers Sectional Committee, MCPD 12, (ISI)
Shri Y. A. Pradhan	Rallis India Limited, Bombay
Shri M. L. Shah (*Alternate*)	
Shri D. N. V. Rao	Tata Chemicals Limited, Mithapur
Shri C. Neelkanthan (*Alternate*)	
Dr K. K. Saxena	Indofil Chemicals Limited, Bombay
Shri G. Natarajan (*Alternate*)	
Shri A. C. Shroff	Excel Industries Limited, Bombay
Shri P. V. Kango (*Alternate*)	
Shri N. S. Venkataraman	Pesticides Testing Laboratory, Kovilpatti
Shri E. R. Viccajee	Paper & Flexible Packaging Sectional Committe, MCPD 14 (ISI)
Dr B. L. Wattal	National Institute of Communicable Diseases, Delhi
Shri V. N. Bhatnagar (*Alternate*)	

INTERNATIONAL SYSTEM OF UNITS (IS UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

PUBLICATIONS OF INDIAN STANDARDS INSTITUTION

INDIAN STANDARDS

Over 10 000 Indian Standards covering various subjects have been issued so far. Of these, the standards belonging to the Agricultural and Food Products Group fall under the following categories:

- Abattoir
- Alcoholic drinks
- Animal feeds
- Animal housing and equipment
- Bakery and confectionery
- Bee-keeping equipment
- Beverages
- Cereals, pulses and their products
- Cocoa products
- Coffee and its products
- Dairy equipment
- Dairy industry, layout plans
- Dairy industry, methods of test
- Dairy laboratory apparatus
- Dairy products
- Edible starch and starchy products
- Farm implements and machinery
- Fish and fishery products
- Fish industry, sanitary conditions
- Food additives
- Food grain handling and storage
- Fruits and vegetables
- Honey and by-products
- Infant foods
- Laboratory animals
- Meat and meat products
- Pest control equipment
- Pesticidal formulations
- Pesticides, technical grade and general
- Propagation materials
- Regulated market yards
- Sensory evaluation
- Spices and condiments
- Starch derived products
- Sugar and by-products
- Tea
- Tobacco products
- Transport of live animals

OTHER PUBLICATIONS

SI Bulletin (Published Every Month)	
Single Copy	Rs 4·00
Annual Subscription	Rs 36·00
Standards : Monthly Additions	
Single Copy	Re 0·30
Annual Subscription	Rs 3·00
Annual Reports (from 1948-49 Onwards) .	Rs 2·00 to 7·00
ISI Handbook, 1980	Rs 100·00

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31 **Telegrams : Manaksanstha**

Regional Offices:		Telephone
Western : Novelty Chambers, Grant Road	**BOMBAY 400007**	**37 97 29**
Eastern : 5 Chowringhee Approach	**CALCUTTA 700072**	**27 50 90**
Southern : C. I. T. Campus, Adyar	**MADRAS 600020**	**41 24 42**
Branch Offices:		
'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	2 76 49
Gangotri Complex, Bhadbhada Road, T. T. Nagar	BHOPAL 462003	6 27 16
22E Kalpana Area	BHUBANESHWAR 751014	5 36 27
Ahimsa Bldg, SCO 82-83, Sector 17C	CHANDIGARH 160017	2 83 20
5-8-56C L. N. Gupta Marg	HYDERABAD 500001	22 10 83
D-277 Todarmal Marg, Banipark	JAIPUR 302006	6 98 32
117/418 B Sarvodaya Nagar	KANPUR 208005	8 12 72
Patliputra Industrial Estate	PATNA 800013	6 28 08
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	82 27

Printed at New India Printing Press, Khurja, India